Boundary-spanning in Engineering Community Engagement: Empathy as a Key

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Research Objectives

- *Determine the linking mechanisms of boundary spanning which can optimize community engagement initiatives around stakeholder needs in engineering education.*
- *Explore the developed framework through investigating ways in which community engaged student learning can impact empathy in engineering undergraduates.*
- *Develop transferable instructional tool for empathy in engineering*
- *Further explore additional components of the framework.*

Theoretical Foundation

Boundary Spanner *is an individual, place, or object which acts as a knowledge and power broker establishing reciprocal relationships between a university and its external partners.*

Community Engagement *is the collaboration between institutions of higher education and their larger communities for the mutually beneficial exchange of knowledge and resources in a context of partnership and reciprocity.*

Fig.1 Stakeholder Collaboration in Community Engagement

Research Interview

- *Semi-structured interviews*
- *30 participants within 5 stakeholder categories*
- *Dynamics of community engagement, barriers, facilitators, outcomes explored*
- *Engagement barriers reflected from the interviews:*

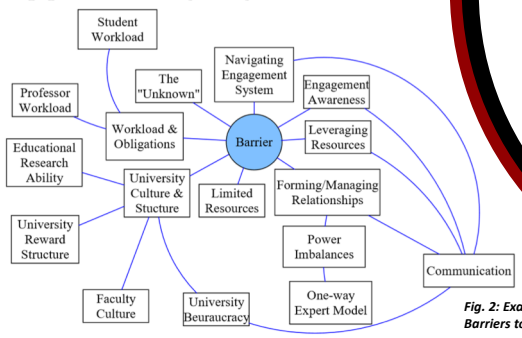

Fig. 2: Example Category Tree, Barriers to Community Engagement

- *"Everybody thinks [engagement activities] are good, but in evaluations they don't count much, so they end up being marginalized", Engineering Professor said.*

Boundary-spanning Framework within Community Engagement

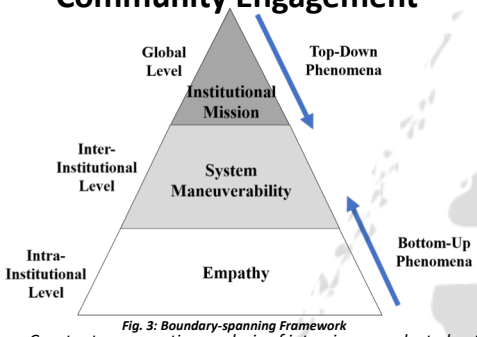

Fig. 3: Boundary-spanning Framework

Constant comparative analysis of interviews conducted across a São Paulo, Brazil STEM education community, reveals important dynamics within community engagement

Empathy in Engineering

Empathy is an important factor and interlinking mechanism within the engagement landscape. In engineering, it impacts professional success and outcomes, communication , design processes, and the overall culture of engineering. (Walther et al., 2017)

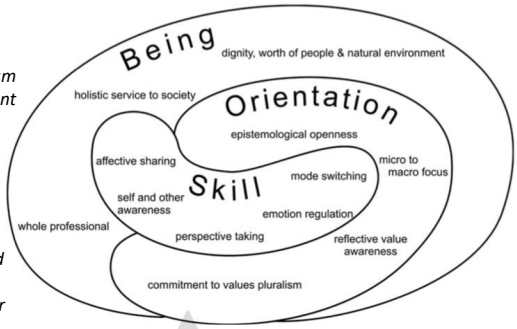

Fig.5 The model of empathy for engineering

Engagement Landscape

Community Engaged Student Learning (CESL) as a platform for empathy is investigated across the spectrum of experiential learning opportunities.

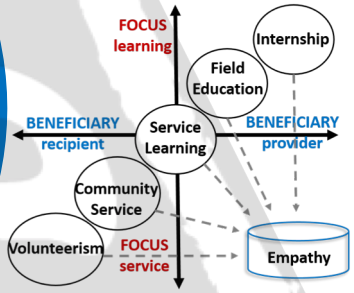

Fig. 6: Community Engagement Spectrum

Engagement Landscape

Engagement Landscape shows the partnerships between stakeholders. Aligning missions and outcomes, overcoming system complexity, and fostering empathy provide a pathway to enhance outcomes.

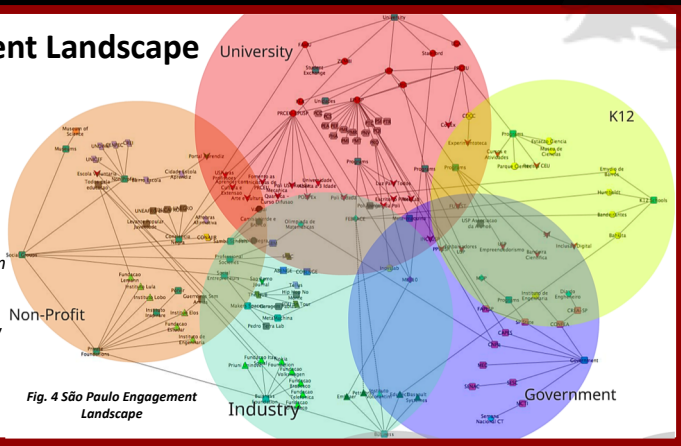

Fig. 4 São Paulo Engagement Landscape

Future Work

A pilot study within a service-learning CESL activity in Honduras has informed the pursuit of further research. The participating students recognized the CESL experience held many opportunities for growth of empathy, however, the extent to which empathy growth can be linked to engineering requires further investigation. An NSF grant has been submitted.

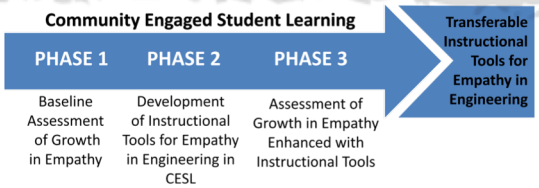

Fig. 7: Research Overview

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